

Living with Sugar: Influence of Cultural Beliefs on Type 2 Diabetes Self-Management of English-Speaking Afro-Caribbean Women

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Abstract Studies show that cultural beliefs influence disease conceptualization, adaption, and coping strategies of chronic diseases. This study investigated the type 2 diabetes cultural belief model of English-speaking Afro-Caribbean women in southwest Florida. A 53 item cultural consensus beliefs questionnaire was designed and administered to 30 Afro-Caribbean women diabetics. Cultural consensus analysis found that these women shared a single cultural belief model about type 2 diabetes, $.72 \pm .081$ SD. Women with higher cultural knowledge scores ($r_s = -.41730$, $P = .0218$) were significantly younger at type 2 diabetes diagnosis than women with lower scores. In qualitative interviews, women described ongoing struggles to modify their traditional Caribbean diet and believed in the efficaciousness of traditional Caribbean medicine and prayer to treat type 2 diabetes. These findings suggest that health practitioners treating English-speaking Afro-Caribbean diabetics should offer culturally appropriate nutritional guidance and inquire about their use of traditional Caribbean medicines.

Keywords Type 2 diabetes · English-speaking Afro-Caribbean women · Southwest Florida · Cultural beliefs · Cultural consensus analysis

Introduction

In the US, 25.8 million people (8.3% of the population) are estimated to have diabetes, (18.8 million diagnosed) [1].

Approximately, 90–95% of all diagnosed cases of diabetes are type 2 diabetes [1]. The American Diabetes Association recommends that physician coordinated management plans consider “cultural factors” because individuals who receive culturally appropriate diabetes self-management education (DSME) have better outcomes [2]. Caribbean and Latin American immigrants, particularly women are 2–4 times more likely to be diagnosed with type 2 diabetes than non-Hispanic whites [1, 3]. Yet despite the long history of English-speaking Afro-Caribbean communities in the US, there has been a dearth of literature about their cultural beliefs and behaviors as related to type 2 diabetes and its self-management. The purpose of this study was to investigate English-speaking Afro-Caribbean women’s cultural beliefs about type 2 diabetes in order to inform their health practitioners about cultural factors that might influence their patients’ diabetes self-management. To accomplish this goal, this research used cultural consensus analysis and semi-structured interviews to examine the cultural explanatory model of type 2 diabetes among English-speaking Afro-Caribbean women and how it influenced their self-management.

Background

Individuals suffering from chronic diseases such as type 2 diabetes develop coping strategies to deal with the stress of their illness [4]. This disease conceptualization leads these individuals to adapt their lives, even causing them to alter their self-identity. Cultural beliefs have been identified as an influence on disease conceptualization, adaption, and coping strategies [4, 5]. Cultural beliefs encompass disease causation, symptoms, alternative treatments, standard treatment practices, and perception of treatment outcomes [5]. Cultural

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knowledge is shared and built on memory and communal experiences [6, 7]. The cultural beliefs of diabetic patients have an impact on their treatment behaviors both positively and negatively [5, 8–10]. Understanding cultural beliefs about type 2 diabetes and how they might conflict with biomedical knowledge would improve self-management programs that target at risk minority ethnic groups.

Cognitive anthropology views culture as the shared beliefs and knowledge of a group [11]. A cultural model is described as an individual's reasoning of their environment through an organized set of words or concepts (cognitive schema) drawn from one or more cultural domains shared by the social group [11]. What distinguishes the individual's understanding of a cultural model from mere general knowledge is that this understanding is shared among others in the group to a certain degree. However, the individual's ability to act in accordance with the cultural model may be constrained at times due to structural barriers such as limited financial resources [12].

To measure “the sharing of cultural beliefs,” Romney et al. [13] developed the cultural consensus model [13]. This model statistically measures the level of agreement among individuals and weighs the individual's cultural knowledge based on his/her responses to the overall group. Unlike medical knowledge tests which measure the biomedical “correct” answers, cultural consensus analysis measures the culturally “correct” answer [14]. The cultural consensus model has been criticized as an “idealistic” approach to studying culture because it measures the frequency of cultural beliefs and patterns of agreement without reliability and meaning/interpretation [8, 15]. However, cultural consensus analysis has been used to discover cultural explanatory models about type 2 diabetes [8, 10, 16, 17], hypertension [18–20], malaria [21], disease/illness concepts [22], HIV/AIDS [23], and cancer risk [24]. This study used both the cultural consensus model along with semi-structured interviews to identify: (1) if English-speaking Afro-Caribbean women shared cultural beliefs about type 2 diabetes, and (2) how these cultural beliefs influenced their type 2 diabetes self-management.

Methods

The University of South Florida Institutional Review Board approved the qualitative and quantitative methods used to conduct phase one and two of this study. Written and oral informed consent was acquired from all the participants.

Participants

Convenience and snowball sampling techniques were used to recruit a sample of 50 English-speaking Caribbean

Table 1 Characteristics of 30 English-speaking Afro-Caribbean women diagnosed with type 2 diabetes

Socio-demographic	Mean	SD	Range
Age	63.5	12.7	36–87
Years living in US	20	11.5	4–41
Years of education	12	3.2	6–17
No. of children	3.5	1.9	0–8
Years of type 2 diabetes duration	11.6	9.9	.5–38
Age at type 2 diabetes diagnosis	52	13.8	29–87

women of African descent from 35 to 90 years of age in southwest Florida. In the first phase, 10 women who self-reported a type 2 diabetes diagnosis and 10 women without the disease were recruited to gather preliminary data. In the second phase, 30 additional participants who self-reported a type 2 diabetes diagnosis were recruited for the cultural consensus analysis and qualitative interviews. Of these 30 participants, 19 (63.4%) were from Trinidad and Tobago, 10 (33.3%) participants were from Jamaica, and one (3.3%) participant was from Curaçao. Table 1 presents the following socio-demographic variables of the 30 participants: age, years living in the US, years of education, number of children, duration of type 2 diabetes and age of type 2 diabetes diagnosis. The women recruited in the first phase had lived in the US for approximately three fewer years and were on average six years younger than the women in the second phase, but both groups of women had similar mean number of children, years of education and incomes. Table 2 shows the type 2 diabetes complications and other diagnosed chronic diseases reported by the 30 participants recruited in the second phase.

Data Collection

Over the initial four month period, the first 20 participants were recruited in person and with flyers posted at Caribbean community events and grocery stores/restaurants. However, these recruitment efforts failed to yield sufficient participants to conduct the cultural consensus analysis so the researcher used local networks to gain access to a private medical clinic of two Afro-Caribbean physicians. One of the physicians estimated that about 50% of their patients were from the Caribbean. Three months later, participants were recruited at this private medical practice. This physician and his medical assistants helped to identify patients who met this study's eligibility criteria. These patients were directed to a private room where they were assured that their participation was voluntary and would not affect their medical care. The Principal Investigator (C.A.S.S.) conducted and recorded the data collection process which ranged from 28 to 68 min. Fifteen participants were interviewed over the telephone.

Table 2 Medical conditions of 30 English-speaking Afro-Caribbean women diagnosed with type 2 diabetes

Medical conditions	Number	Percentage
Hypertension	22	73.2
High cholesterol	9	30
CVD	3	10
Blindness/impaired vision	5	16.6
Chronic renal failure	1	3.3

Measures

In the first phase, a free list questionnaire about type 2 diabetes was designed and administered to the 20 participants. Free listing is a qualitative technique is used to collect cultural knowledge by asking individuals to list all they know about a particular cultural domain [25]. In this study, participants were asked to list everything they knew about five aspects of type 2 diabetes; prevention, causes, symptoms, complications, and treatment. The free list data were gathered from the 10 participants without type 2 diabetes to increase the likelihood that cultural beliefs shared throughout the community were collected rather than only medical knowledge from having the disease. However, experiences with family and friends who have the disease contribute to both cultural and medical knowledge. Conducted individually, the semi-structured interviews asked the 10 diabetic participants about their reaction to their diagnosis, changes to their diet and lifestyle after diagnosis, coping strategies, and challenges of self-management.

In the second phase, socio-demographic, behavioral, medical history data were collected from the 30 diabetic participants and then, the cultural consensus questionnaire was administered orally. The cultural consensus questionnaire was designed using the free list and interview data as well as American Diabetes Association criteria for type 2 diabetes. The questionnaire had 53 items grouped together in sections on type 2 diabetes prevention, causation, symptoms, complications and treatment. There were seven prevention items, 11 causation items, 14 symptom items, 13 complication items, and eight treatment and self-management items. The questionnaire had a “yes” and “no” answer key. The responses were coded, “1 = yes” and “0 = no.” The questions were carefully constructed so that the “yes” responses were 50/50 positive and negative, thereby reducing the instances of guessing by the participants. Participants were assured that there was no right or wrong answers. Table 3 presents the free list questions and a sample of questions from the cultural consensus questionnaire.

The semi-structured interview protocol was revised using the preliminary interview data to include questions

Table 3 Free list and cultural consensus questions

Free list questions

1. What are all the different ways of preventing type 2 diabetes (sugar)?
2. What do you think causes type 2 diabetes (sugar)?
3. How do you know that you have type 2 diabetes (sugar)? What are the symptoms?
4. What are the health problems (complications) caused by type 2 diabetes (sugar)?
5. What are the treatments for type 2 diabetes (sugar)?

Cultural consensus questions

Prevention

1. Can eating right prevent diabetes?
2. Will getting tested by the physician stop diabetes from occurring?
3. Is there any way to prevent diabetes?

Causation

1. Is a person who is careful about what they eat likely to develop diabetes?
2. Is diabetes hereditary?
3. Did living in the US cause you develop diabetes?

Symptoms

1. Are people with diabetes full of energy?
2. Are wounds that heal well and quickly a symptom of diabetes?
3. When ants follow the urine does a person have diabetes?

Complications

1. Can diabetes lead to amputations of the lower leg and feet?
2. Does diabetes cause the kidneys to function properly?
3. Can diabetes cause a heart attack?

Treatment

1. Does gaining weight help control diabetes?
2. Do alternative medicines like bush teas, caraili, etc. help control diabetes?
3. Does having a Caribbean diet with traditional food help control diabetes?

about the traditional Caribbean diet, lifestyle choices, and other specific coping strategies such as prayer and support network. Detailed notes were taken of the four semi-structured interviews that were inaudible. Twenty-eight participants responded to the revised semi-structured protocol (two participants did not agree to be interviewed).

Analysis

The socio-demographic, behavioral, medical history data was entered into SAS 9.1 for descriptive analysis. The free list data were entered into ANTHROPAC 4.98 for analysis. The free list analysis provided the salience (*Smith's S*) which measures the high frequency of a response along with its rank on the participants' lists. Items with a frequency ≥ 2 were included in the cultural consensus questionnaire.

Table 4 Results of cultural consensus analysis

	Factor	Eigenvalue	Ratio between 1st and 2nd eigenvalue	Variance %	Mean cultural knowledge
30 Participants	1	15.739	7.500	83.0	.72 (\pm .081 SD)
	2	2.099		11.1	
	3	1.135		6.0	
7 Participants with medical training	1	3.785	7.237	87.7	.73 (\pm .087 SD)
	2	.528		12.3	
23 Participants without medical training	1	12.098	7.594	83.0	.721 (\pm .081 SD)
	2	1.593		10.9	
	3	.881		6.0	

Cultural Consensus Analysis

The cultural consensus responses were entered into and analyzed in ANTHROPAC 4.98 to determine degree of consistency/agreement of cultural beliefs [26]. Prior to starting this study, the level of agreement or cultural knowledge of participants was unknown so a conservative estimate of $P = .5$ group level of agreement, $P < .99$ confidence level, and $P = .95$ high accurate level of item classification with a sample size of 30 was used to conduct this cultural consensus model analysis [27, 28].

In addition, the cultural consensus analysis calculated individual knowledge scores from 0 to 1, the closer to 1, the more culturally knowledgeable [29]. Spearman correlation analysis was performed in SAS 9.1 to determine if there was a significant co-variation at $P < .05$ between participants' individual cultural knowledge scores and the socio-demographic variables; age, age of type 2 diabetes diagnosis, years of education, years of type 2 diabetes duration, and length of time in the US [17, 29].

Semi-Structured Interviews

The preliminary interview data were entered into Atlas.ti 5.0, a software program for thematic analysis. The themes that emerged were used to revise the semi-structural interview protocol. Audio-recordings of these interviews were transcribed and entered into Atlas.ti 5.0 where they were coded and additional themes were identified.

Results

Type 2 Diabetes Cultural Beliefs Model

The cultural consensus analysis found that respondents shared a single cultural belief model about all five areas of inquiry: prevention, causes, symptoms, complications, and treatment of the disease. The eigenvalue of the first

factor was 15.739, while the eigenvalue of the second factor was 2.099 (see Table 4). Thus, the ratio of the first to second eigenvalue was 7.498 to 1 which is greater than the 3 to 1 ratio required to meet the goodness of fit criteria for the cultural consensus model (Weller and Mann 1997). The first factor explained 83% of the variation of participants' cultural beliefs about type 2 diabetes. The homogeneous cultural beliefs about type 2 diabetes were shared by 72% of the participants (\pm .081 SD). The cultural consensus analysis found that both the participants with and without medical training shared a single belief model about type 2 diabetes. Participants who were trained as medical assistants, licensed practical nurses, and registered nurses were considered to have medical training. The Spearman correlation analysis found that participants with higher individual cultural knowledge scores were younger at age of type 2 diabetes diagnosis than participants with lower individual cultural knowledge scores, $r_s = -.41730$, $P = .0218$ (see Table 5). Figure 1 indicates the three highest ranking cultural beliefs about type 2 diabetes.

English-Speaking Afro-Caribbean Women's Cultural Beliefs About Type 2 Diabetes Elicited by Interview

The primary themes that emerged from the interviews were the efficaciousness of traditional medicine, modification of traditional Caribbean diet, and the importance of prayer

Table 5 Spearman correlation analysis results of cultural knowledge scores and socio-demographic variables

Variables	r_s	P
Age	-.22355	.2350
Age at type 2 diabetes diagnosis	-.41730	.0218
Years of type 2 diabetes duration	.29401	.1148
Years of education	.32204	.0826
Length of time in the US	.17093	.3665

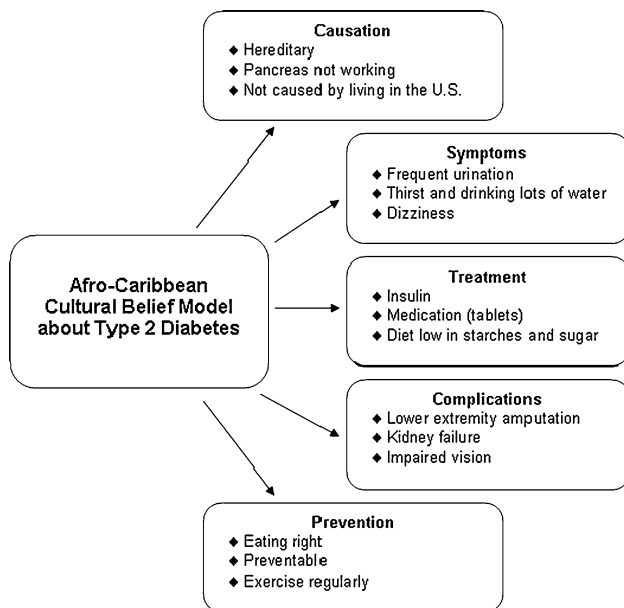


Fig. 1 English-speaking Afro-Caribbean women cultural belief model about type 2 diabetes

and faith. However, there were no statistically significant relationships between these beliefs and socio-demographic variables. These themes are presented next.

Efficaciousness of Traditional Caribbean Medicines

Participants believed that traditional Caribbean medicines were effective treatments for type 2 diabetes as well as other medical conditions such as high blood pressure. Fifty-seven percent of participants used the following traditional Caribbean medicines to treat type 2 diabetes; cerasse/noni/caraili/bitter melon (*Momordica charantia*), cinnamon bark and pills (*Cinnamomum verum*), mauby bark (*Colubrina arborescens*), aloe (*Aloe vera*, *Aloe barbadensis*), bush tea (unspecified medicinal plants) and celery (*Apium graveolens*). Participants stated that they also used cucumber (*Cucumis sativus*), garlic (*Allium sativum* L.), and tamarind leaf (*Tamarindus indica*) to control high blood pressure. These plants were crushed, liquefied, and consumed cold or steeped as a brewed tea. *Momordica charantia* was the most popular botanical that participants used to treat type 2 diabetes. A 46 year old domestic worker stated:

[Caraili/*Momordica charantia*] helps keep the blood sugar down because caraili is a bitter thing. The green leaf herbs helps, anything green and leafy that you can blend, that you can juice, that you can drink, it helps bring down the sugar level.

Participants viewed traditional Caribbean medicine as complementary to prescribed medicines. However, they

also believed that using traditional Caribbean medicine could eventually help “wean” them off prescribed medicines.

Modification of Traditional Caribbean Diet and Lifestyle

Seventy-six percent of the participants believed that their traditional Caribbean diet did not help control their glucose levels. They explained that they considered the traditional Caribbean diet to be high in starches, sugars, and fat content with large portion sizes. They recognized the need to eat healthier foods such as green vegetables, brown rice and bread, chicken, and fish instead of pork and red meat and eschew consuming starchy foods such as white rice and bread as well as sugary fruits like mangoes, apples and breadfruits. Participants frequently mentioned the term, “moderation.” A 56 year old minister stated:

Eat everything in moderation. Like black, fruit cake, I love black cake, but I will eat a small piece with Christmas is coming, it is the greatest challenge that I have, but I have to so I am psyching up myself. There is nothing that I cannot eat, but it is moderation and not too often. I may eat ice cream once a month, maybe twice, and just a scoop.

It should be noted that 27 (90%) participants failed to mention physical activity in their type 2 diabetes management. After the interviewer probed, participants stated that they walked around their neighborhoods occasionally or tried to incorporate exercise in their daily lives by parking further away or taking the stairs at their place of employment. They admitted that they knew that they should engage in more physical activity, but they were not inclined to devote time to do so on a regular basis.

Prayer and Faith

Prayer and faith was another theme that emerged as an important aspect of participants’ management of type 2 diabetes. Ninety percent of the participants believed that prayer was a complementary treatment to control type 2 diabetes. A 56 year old minister who was legally blind stated:

I pray about everything. And God answers prayer. But prayer, faith without works is dead. Prayer is not a magic thing. There is stuff that we have to do. I could pray until never-rary, unless I do what I am supposed to do, it wouldn’t help. Like for instance, I cannot be praying for God to heal me from my diabetes and then I am just eating that is wrong. That is ludicrous.

Participants believed that prayer and faith complemented biomedical and traditional Caribbean medicine to manage type 2 diabetes and its complications. Even participants who expressed frustration with the disease referred to their belief in God as hope that their health would improve and/or become more tolerable in time.

Discussion and Conclusion

The cultural consensus analysis found that participants shared a single cultural belief model about the disease's prevention, causation, symptoms, complications, and treatment. Cultural consensus analysis studies have also found shared cultural models about type 2 diabetes in other populations including the Anishinabe in an Ojibway community [8], Mexicans in Guadalajara [10], Latino communities in the US, Mexico, and Guatemala [16], and ethnic groups in Thailand [17].

The finding that participants with higher cultural knowledge scores were younger at the age of type 2 diabetes diagnosis suggests that over time they accumulated more cultural knowledge about the disease than their counterparts with lower cultural knowledge scores. As in this study, English-speaking Afro-Caribbean diabetics in the UK also reported that their cultural beliefs about the disease originated from friends and family members along with childhood memories of the Caribbean [30]. These findings support the cultural schema theory argument that it is through collective memory and social framework that cultural belief models are constructed and shared in communities [8].

The cultural belief in the efficaciousness of traditional Caribbean medicine was also found among English-speaking Afro-Caribbean diabetics in the UK [30, 31] and in the English-speaking Caribbean as well [32–36]. *Momordica charantia*, the most popularly used plant among English-speaking Afro-Caribbean diabetics, is also used in traditional Chinese and Indian medicine to treat the disease [37, 38]. Recent studies indicate that *Momordica charantia* might help control glucose levels [39, 40]. In this study, participants complained about the bitter taste of *Momordica charantia* and other traditional Caribbean medicines. However, the use of a bitter liquid to treat the “sweetness” in the blood suggests an attempt to restore harmony and balance to the body which is a cultural health belief shared by other cultures. For example, Mexican-Americans diagnosed with type 2 diabetes also reported drinking bitter liquids from plants to control their glucose levels [41]. Consequently, health practitioners serving these communities should ask their Afro-Caribbean and Latino diabetic patients about their use of traditional medicines since they are unlikely to volunteer this information.

Participants' belief that their traditional Caribbean diet did not help control their glucose levels because it had high fat and carbohydrate content was shared by English-speaking Afro-Caribbean diabetics in the UK [30, 31, 42]. Food frequency and food diary studies conducted with Afro-Caribbean communities in the US and UK found their diets to be comprised of high starchy carbohydrates with meat or fish that were prepared by frying in oil [43–45]. The traditional English-speaking Caribbean diet is high in starchy carbohydrates and energy from fat [46–48]. A study conducted in Barbados by Sharma and colleagues (2008) found that the most frequently consumed foods and drinks were sugar, followed by oat bran/multigrain/sweet breads, rice/rice and peas, bananas, and evaporated milk (whole), white bread/buns, crackers, carrots, vegetable salads, apples, sweetened juices, porridges, fried fish/salt fish [46]. A nutritional analysis of recipes showed that 1) Chicken, fish and rice dishes provided 25% of the overall energy intake, 2) Chicken and fish dishes provided 26% of overall fat, 3) Sweetened juices and drinks contributed over 40% of the sugar intake, and 4) Bread, cereal, and rice dishes were the sources of 33% of dietary fiber. Health practitioners and dieticians serving the Caribbean community should become familiar with the traditional Caribbean diet so they can offer culturally appropriate dietary recommendations. Health practitioners should also emphasize the importance of regular physical exercise to controlling glucose levels to their Caribbean diabetic patients.

The cultural belief that prayer and faith could help treat type 2 diabetes and its complications was also reported by Afro-Caribbean diabetics in the UK [30, 31] and Mexican-Americans diabetics [41]. The importance of prayer and faith suggests that further research should explore strategies to incorporate the church into interventions that target English-speaking Afro-Caribbean diabetics as well as other Caribbean and Latino populations.

Limitations

For a study to have generalizability or external validity, the sample must be representative of all the individuals in that group diagnosed with the disease [46]. The sample size of this study was small and since there are currently no statistics about the women of African descent from the English-speaking Caribbean diagnosed with type 2 diabetes in the US, it is difficult to determine if this study population is a representative sample or if it diverges substantially from the characteristics of this group. Thus, this study should be viewed as preliminary research which can be built upon in future studies in this population.

Information bias occurs when the information about participants is inaccurate because there were flaws and

inadequacies in the data collection methods [46]. In this study, six participants were related to each other; two pairs of sisters and one mother and daughter. Although each individual responded independently to the cultural consensus questionnaire and the interviews and the analysis showed no notable differences in their responses compared to the other participants, their familial relationship might have resulted in the similar responses to the questions.

Another limitation was the lack of access to participants' medical records and most recent fasting glucose tests. As a result, this study could not examine the differences in cultural beliefs and behaviors between participants with good glucose control and those experiencing severe diabetes sequelae.

New Contribution to the Literature

Cultural consensus analysis has never been conducted in the Afro-Caribbean community, an understudied ethnic minority population. Combining this quantitative analysis with qualitative interviews, this anthropological approach focuses on understanding the complex relationship between cultural beliefs and the self-management challenges facing diabetics in this community. However, these findings might also be relevant to other immigrant communities with high type 2 diabetes prevalence in the US.

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